Journal of Infectious Diseases and Therapy
ISSN: 2332-0877

Walong and Barasa, J Infect Dis Ther 2015, 3:2
DOI: 10.4172/2332-0877.1000205

Commentary Open Access

Primary Immunodeficiency in Africa, a Case for Autopsy Based Implementation Science Projects

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Received date: July 21, 2014, **Accepted date:** Mar 18, 2015, **Published date:** March 25, 2015

Abstract

Primary immunodeficiency encompasses a broad range of constitutional innate and adaptive immune dysfunction characterised by recurrent or severe infections. In developing countries in sub-Saharan Africa there are high rates of infectious disease morbidity and mortality. Low autopsy rates, inadequate diagnostic infrastructure limits the diagnosis and characterisation of primary immunodeficiency. Targeted implementation science approaches to clinical autopsy in developing sub-Saharan countries would evaluate the magnitude of this problem and provide innovative diagnostic approaches.

Keywords: Primary immunodeficiency; Autopsy; Sub-Saharan Africa

Commentary

Primary immunodeficiency encompasses a broad range of constitutional innate and adaptive immune dysfunction characterised by recurrent or severe infections [1]. In developing countries in sub-Saharan Africa there are high rates of infectious disease morbidity and mortality. Inadequate diagnostic infrastructure limits the diagnosis and characterisation of primary immunodeficiency [1,2].

Autopsy diagnosis is therefore invaluable as a source of reliable data. Evaluation of gross and microscopic anatomy, in addition to immunophenotyping and microbiological assays is useful for accurate diagnosis [3]. This identifies index cases providing opportunity for genetic counselling and management of heritable immunodeficiency states. This is useful for epidemiologic surveillance and improvement of verbal autopsy tools for detection of primary immunodeficiency.

Low autopsy rates are due to inadequate autopsy infrastructure and training in the region. For example, the clinical autopsy rates at Kenyatta National Hospital (KNH), a tertiary referral hospital in Kenya are less than 2%, which is below the threshold required to detect major and minor diagnostic discrepancies [4]. When compared to the developed world where clinical autopsy rates are on the decline, in Africa, proper autopsies are performed in a few hospitals within urban areas [4]. In Kenya, medium income African country with a population of 45 million, less than 300 clinical autopsies were performed in 2014, the majority (250) were performed at KNH (Personal Communication, Dr John Mathaiya). A robust autopsy pathology service would have detected index cases and averted the recent Ebola outbreak [5]. Therefore, autopsy rates in Africa can only increase, as health care expenditure and awareness continues to improve [4].

There are several examples where autopsy data has enabled appropriate response to public health challenges. Chintu's study, which was performed in Zambia, provided the evidence necessary for implementation of the World Health Organization's intergrated management of childhood illnesses (IMCI) and HIV [6]. Further areas that require autopsy include the pathology of central nervous infection, malaria, dementia, enteric infections, hepatitis and other emerging/reemerging infections [7]. Autopsy studies have a great potential in the investigation of the unprecedented cancer epidemic in Africa [4]. Due to high rates of paediatric infections, autopsy studies remain a powerful tool for diagnosis of primary and secondary immune deficiencies in addition to their role in infectious disease mortality [3].

Data from autopsy based public health approaches may be useful for the rationalization of health care expenditure and planning [7]. This can also drive innovation in health care diagnostics, especially when combined with modern laboratory techniques. We hypothesize that implementation science projects that improve upon autopsy procedures, data management, reporting, feedback and publication would identify cases of primary immunodeficiency in the setting of high infectious disease mortality.

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